

# Migration of silicone catheter into pleural space: a case report

Chen-Yu Wong, Hsuan-Tzu Yang and Chun-Hsien Hsin\*

Division of Thoracic and Cardiovascular Surgery, Department of Surgery, Chang Gung Memorial Hospital, Linkou, Taiwan

\*Correspondence address. Division of Thoracic and Cardiovascular Surgery, Department of Surgery, Chang Gung Memorial Hospital, Linkou, Taiwan. No.5, Fusing St., Kwei Shan Dist., Taoyuan 333, Taiwan. Tel: +886-3-3281200 ext. 2104; Fax: +886-3-3285818; E-mail: [hsinchunhsien@gmail.com](mailto:hsinchunhsien@gmail.com)

## Abstract

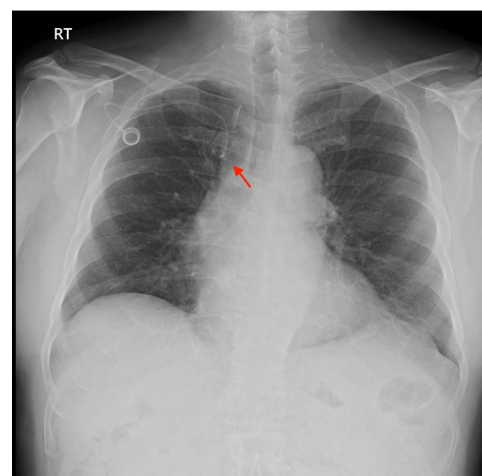
**Background:** The totally implantable venous access port (TIVAP) is widely used for chemotherapy, transfusions and parenteral nutritional support. Dysfunction of TIVAP is not uncommon in clinical practice in cases of several etiologies. Herein, we report a rare case of TIVAP dysfunction due to a catheter that migrated into the pleural space. **Case presentation:** We present a case of a 70-year-old man of TIVAP dysfunction due to a rare catheter extra-vascular migration into the pleural space, diagnosed by computed tomography. We decided on observation without further utilization of the TIVAP and a shift to oral chemotherapy, after a discussion with patient and his primary care oncologist. **Conclusion:** Our case highlighted the importance of proper evaluation of TIVAP catheter location before its usage or replacement.

## INTRODUCTION

The totally implantable venous access port (TIVAP) is widely used as a reliable route for chemotherapy, transfusions or parenteral nutrition support. Dysfunction is one of the most frequent complications of TIVAP. The etiologies described in the literature include venous thrombosis around the catheter, catheter obstruction, catheter disruption or dislocation [1]. Herein, we report the rare case of TIVAP dysfunction due to catheter migration into the pleural space.

## CASE REPORT

A 70-year-old man presented to the vascular surgical outpatient clinic with TIVAP dysfunction. He received TIVAP (8-Fr Polysite silicone catheter in 2018, Perouse Medical, Ivry-Le-Temple, France.) implantation more than 3 years ago. He had received monthly 80 mg intravenous docetaxel treatment for left lung squamous cell carcinoma after the TIVAP implantation. As patient's statement, he has dry cough before diagnosed of lung squamous cell carcinoma and persistent during the course of chemotherapy. Obstruction of the device occurred during blood aspiration though a smooth intravenous push was reported by nursing staff in the outpatient chemotherapy unit. Neck and facial flush and mild dyspnea had developed hours after infusion of chemotherapeutic agents in the past 6 months. On examination, the port was well fixed, with a fair depth of puncture. Migration of the catheter tip was found by plain film check-up (Fig. 1, arrowhead), compared with the image obtained 6 months ago. Chest computed tomography revealed that the catheter migrated through the superior vena cava (SVC) into the pleural space (Fig. 2, arrowhead). Catheter removal with SVC repair via sternotomy or endovascular stent graft coverage with adequate pericardial drainage was advised,



**Figure 1.** Migration of the catheter tip (arrowhead).

but the patient chose conservative treatment for the migrated device. Oral Vinorelbine 100 mg twice per month was initiated after a discussion with the primary care oncologist. This helped keep the patient in asymptomatic and tumor recurrence-free status during the 1-year follow-up.

## DISCUSSION

The totally implantable venous access port (TIVAP) is widely used for chemotherapy, transfusions and parenteral nutrition. The incidence of TIVAP malfunction ranges from 0.67 to 3.7% [2–6]. Etiology includes intra-catheter thrombosis or precipitation, fibrin sheath formation or venous thrombosis around the catheter,

Received: September 23, 2022. Revised: March 18, 2023. Accepted: March 31, 2023

© The Author(s) 2023. Published by Oxford University Press. All rights reserved. For permissions, please e-mail: [journals.permissions@oup.com](mailto:journals.permissions@oup.com)

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited. For commercial re-use, please contact [journals.permissions@oup.com](mailto:journals.permissions@oup.com)



**Figure 2.** The catheter migrated through the SVC into the pleural space (arrowhead).

catheter kinking, pinch-off syndrome and catheter migration [7]. The incidence of spontaneous catheter migration ranges from 0.4 to 2% based on a review of the available literature [1, 6, 8, 9]. In this case, the migrated catheter penetrated through the superior vena cava (SVC) into the pleural space, which is a rare clinical situation.

We postulate that the mechanism of catheter migration may be related to an elevated intra-thoracic cavity due to cough, which is especially frequent in patients with lung cancer, as described by Wu *et al.* [8]. Shallow catheter tip location, which is defined as a catheter tip located above the lower third of SVC, and lung cancer were assumed to be risk factors for catheter migration [8, 9]. Here, the migrated catheter tip was directed towards the post-chemotherapy fibrotic SVC wall, with a combination of radial force caused by the angulating catheter itself, and the kinetic movement of the heartbeat resulting in penetration of the vessel wall into pleural space.

Chou *et al.* reported a case of innominate vein penetration into the pleural space by a left-sided silicone TIVAP catheter 4 months after implantation [10]. The patient had left-side massive pleural effusion after fluid infusion via TIVAP. In our patient, the catheter migrated into the right pleural space via the pericardial space, as shown by CT, which would explain his discomfort after chemotherapy. Over-the-wire catheter exchange or direct catheter removal are the treatment choice for the obstructed TIVAP. However, any intervention affecting the dysfunctional catheter, including removal or exchange may lead to possible lethal hemothorax or hemopericardium without proper closure of the chronic tract, which had been reported in previous reports [11, 12]. Leaving the TIVAP without further utilization did not cause any adverse effect; therefore, this option was also provided. After understanding the treatment options, their risks and benefits, and considering his preferences, goals and beliefs, he did not want to undergo more invasive interventions, due to his old age and advanced cancer status. This decision was made according to the current shared decision making procedure.

In conclusion, extra-vascular migration of the catheter is a rare but important etiology of TIVAP malfunction. Physicians and surgeons should be aware of this risk when inserting a TIVAP as well as the way to prevent it, i.e. catheter tip check before usage or replacement.

## ACKNOWLEDGEMENTS

The authors thank the primary care physician Dr Chin-Teng Yu for detailed case information sharing and the department chief Dr Sheng-Yueh Yu for general support. The authors also acknowledged Renita\_2 from the Editage company for writing assistance and language editing of the manuscript.

## CONFLICT OF INTEREST STATEMENT

No conflicts of interest.

## FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

## ETHICAL APPROVAL

This study was approved by The Institutional Review Board of our institution. (IRB No.: 202200740B0).

## CONSENT

The Institutional Review Board of our institution approved the waiver of the participants' consent.

## GUARANTOR

Chun-Hsien Hsin is the guarantor of this article. The data in this article are available with the guarantor and can be reached by request.

## PRIOR PRESENTATION

This topic had been presented as an e-poster at the 23rd Congress of the Asian Society for Vascular Surgery.

## REFERENCES

1. Tsuruta S, Goto Y, Miyake H, Nagai H, Yoshioka Y, Yuasa N *et al.* Late complications associated with totally implantable venous access port implantation via the internal jugular vein. *Support Care Cancer* 2020;**28**:2761–8. <https://doi.org/10.1007/s00520-019-05122-3>.
2. Goossens GA, Stas M, Jerome M, Moons P. Systematic review: malfunction of totally implantable venous access devices in cancer patients. *Support Care Cancer* 2011;**19**:883–98. <https://doi.org/10.1007/s00520-011-1171-3>.
3. Goossens GA, De Waele Y, Jerome M, Fieuws S, Janssens C, Stas M *et al.* Diagnostic accuracy of the catheter injection and aspiration (CINAS) classification for assessing the function of totally implantable venous access devices. *Support Care Cancer* 2016;**24**:755–61. <https://doi.org/10.1007/s00520-015-2839-x>.
4. Kim JT, Oh TY, Chang WH, Jeong YK. Clinical review and analysis of complications of totally implantable venous access devices for chemotherapy. *Med Oncol* 2012;**29**:1361–4. <https://doi.org/10.1007/s12032-011-9887-y>.
5. Yu XY, Xu JL, Li D, Jiang ZF. Late complications of totally implantable venous access ports in patients with cancer: risk factors and related nursing strategies. *Medicine (Baltimore)* 2018;**97**:e12427. <https://doi.org/10.1097/MD.00000000000012427>.
6. Voog E, Campion L, du Rusquec P, Bourgeois H, Domont J, Denis F *et al.* Totally implantable venous access ports: a prospective long-term study of early and late complications in adult patients with cancer. *Support Care Cancer* 2018;**26**:81–9. <https://doi.org/10.1007/s00520-017-3816-3>.

7. Tabatabaie O, Kasumova GG, Eskander MF, Critchlow JF, Tawa NE, Tseng JF. Totally implantable venous access devices: a review of complications and management strategies. *Am J Clin Oncol* 2017;**40**:94–105. <https://doi.org/10.1097/COC.0000000000000361>.
8. Wu CY, Fu JY, Feng PH, Liu YH, Wu CF, Kao TC et al. Risk factors and possible mechanisms of intravenous port catheter migration. *Eur J Vasc Endovasc Surg* 2012;**44**:82–7. <https://doi.org/10.1016/j.ejvs.2012.03.010>.
9. Wang YC, Lin PL, Chou WH, Lin CP, Huang CH. Long-term outcomes of totally implantable venous access devices. *Support Care Cancer* 2017;**25**:2049–54. <https://doi.org/10.1007/s00520-017-3592-0>.
10. Chou C-M, Yeh C-M. Spontaneous migration of central venous catheter to anterior mediastinum. *Trends J Sci Res* 2018;**3**:147–50. <https://doi.org/10.31586/Surgery.0304.01>.
11. Shields LB, Hunsaker DM, Hunsaker JC. Iatrogenic catheter-related cardiac tamponade: a case report of fatal hydropericardium following subcutaneous implantation of a chemotherapeutic injection port. *J Forensic Sci* 2003;**48**:414–8. <https://doi.org/10.1520/JFS2002071>.
12. Lee HK, Hong SW, Kim GJ, Ryu T, Han JK, Kim JC. Massive hemothorax immediately after removal of central venous catheter—a case report. *Korean J Anesthesiol* 2013;**65**:77–9. <https://doi.org/10.4097/kjae.2013.65.1.77>.